Remarks

Claims 21-41 were pending and under consideration In the Office Action of May 6, 2002, claims 21-41 were subject for final rejection and an objection to the drawings was made.

The drawings were objected to under 37 CFR 1.83(a) as not showing every feature of the invention specified in the claims. Applicant amends the drawings to identify the first electrical contact surface. Applicant also respectfully submits that the first conducting strip is already shown in the previously submitted drawings as element 4. In an effort to advance the examination process, applicant also deletes claims 28 and 29 which recited the means for measuring the electrical resistance, and the means for production and regulation of current flow, respectively. However, applicant does not admit that the specification does not adequately disclose the noted limitation absent illustration thereof. Therefore, Applicant respectfully requests that the objection as to the drawings be removed.

Claims 21-41 are rejected under 35 U.S.C. 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention. Applicant hereby amends claims 21, 24, 26, 27-32, and 38 to more distinctly describe the claimed subject matter. Applicant also deletes claims 22, 25 and 34, without disclaimer of any cancelled limitation. As such, Applicant requests that the 112 rejection be removed with respect to these claims.

Regarding claim 24, the Examiner inquired how a force is determined to be directed "essentially radially" to the center, as recited in claim 24. Applicant respectfully submits that force is defined as a vector having both a magnitude and direction, and therefore, the mounting force is directed essentially towards the center if the directional component of the mounting force is directed essentially toward the center of the piezoelectric resonator. Therefore, Applicant submits that claim 24 is not indefinite.

Examiner also rejected claims 21-27, 30, 31, 33, 35, and 38-41 under 35 U.S.C. 103(a) as being unpatentable over Purdue in view of Kemper. Applicant respectfully traverses this rejection.

Claim 21 in-part recites that "the first and second mounting elements press on the piezoelectric resonator with a mounting force that lies essentially in-plan with the main plane of the piezoelectric resonator."

Even assuming a motivation to combine these references, Applicant submits that Purdue does not teach that this limitates. Specifically, Purdue discloses mounting arms for a piezoelectric resonator that include a channel and a flange to hold the resonator. As a result of this construction, the mounting arms contact and hold the resonator at points on the top and bottom surfaces of the resonator and therefore exert a force that is perpendicular to the main plane of the resonator. These perpendicular forces result in increased stress being applied to the resonator, which affects the oscillation characteristics of the resonator. Additionally, when subjected to temperature fluctuations, the resonator becomes dilated and as a result, the contact between the mounting arms in Purdue and the resonator may become unsecure.

Having the mounting forces exerted by the mounting elements lie "essentially in-plane with the main plane" of the resonator, as recited in claims 21 provides a benefit not present in the cited art. The mounting forces are parallel to the main oscillation plane of resonator, thereby reducing the stress on the resonator. As such, the effect of the mounting forces on the oscillation characteristics of the resonator is reduced. Additionally, when the resonator is subject to temperature fluctuations, the thermal variation in the dimensions of the resonator produce only radial forces on the mounting elements, which can be compensated for by the elastically mounted mounting elements. Therefore, Applicant respectfully submits that claim 21 is allowable over the referenced art.

The Examiner also rejected claim 28 under 35 U.S.C. 103(a) as being unpatentable over Purdue and Kemper as applied to claim 22 and further in view of Jeffers, claim 29 under 35 U.S.C. 103(a) as unpatentable over Purdue and Kemper as applied to claim 22 and further in view of Tanaka, and claims 36 and 37 under 35 U.S.C. 103(a) as unpatentable over Purdue and Kemper as applied to claim 21 and further in view of ordinary skill in the art. Since claims 28, 29, 36, and 37 are dependent from claim 21, Applicant submits that these claims are allowable for the same reasons as discussed above for claim 21.

Finally, Applicant also adds new dependent claim 42, which is allowable for the same reasons that Claim 21 is allowable.

For the aforementioned reasons, it is respectfully submitted that Claims 21-42 are allowable over the prior art, and that the application is now in condition for allowance. Notice to that effect is requested.

Any questions should be directed to the undersigned.

Respectfully submitted,

SONNENSCHEIN NATH & ROSENTHAL

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By: _____
David Metzger
Registration No. 32,919

SONNENSCHEIN NATH & ROSENTHAL
P.O. Box #061080
Wacker Drive Station
Sears Tower
Chicago, IL 60606-6404
(312)876-8000

I hereby certify that this document and any being referred to as attached or enclosed is being deposited with the United States Postal Service as first class mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on

9/6/02 _____
Date JoEllen Hogan

VERSION WITH MARKINGS TO SHOW CHANGES IN SPECIFICATION

Please delete the bridging paragraph on pages 6-7 beginning with "In contrast" and insert the following paragraph:

In contrast, according to the present invention it is provided that, as shown in FIG. 2, the resonator lamina or plate 1 is borne at its edge by mounting elements that cause forces FR that act radially on the resonator lamina at least two clamping points 3. In this case, the force vectors FR lie in the node plane of the piezoelectrically excitable main oscillation (thickness shear oscillation or, respectively, thickness expansion oscillation). In the resonator 1, the electrodes 2, which cover only a part of the flat surface(s) of the lamina 1, are then preferably provided with conductive strips, called contact lugs 3, which extend out to the lateral surface of the resonator lamina. In this construction of the electrodes, the resonator 1 is held at its edge by radially acting forces FR, and the electrical contact is also produced at the same time by contact surfaces 13 on the mounting elements. Alternatively to this, an electrical contacting separate from the mounting, using separate contact elements, would also be possible. In the inventive arrangement, the force vectors of the mounting forces preferably lie in the node plane of the piezoelectrically excitable main oscillation of the resonator, which comprises a corresponding crystallographic orientation. This holds both for thickness shear oscillations and for thickness expansion oscillations.

VERSION WITH MARKINGS TO SHOW CHANGES IN THE CLAIMS

21. (Amended) A piezoelectric resonator arrangement comprising:

a mount having a first mounting element and a second mounting element, the first mounting element having a first electrical contact surface; and

a piezoelectric resonator having a first excitation electrode and a first electrically conductive strip extending from the first excitation electrode to a lateral surface of the piezoelectric resonator [electrical contact point provided on a lateral surface of the resonator];

the piezoelectric resonator being clamped, without the use of adhesive,[in a plane] between the first mounting element and second mounting element, each of the first and second mounting elements abutting [at least one]a lateral surface of the resonator such that the first electrical contact surface [operably] contacts the first electrically conductive strip[first electrical contact point,];

[whereby]wherein each of the first and second mountings presses on the piezoelectric resonator with a [first] mounting force [and the first mounting force]that lies essentially in-plane with the main plane of the piezoelectric resonator.

23. (Amended) An arrangement according to claim [22]21, wherein the first electrically conductive strip extends radially from the first excitation electrode to the lateral surface.

24. (Amended) An arrangement according to claim 21 wherein the [first] mounting force is directed essentially radially to a center of the resonator.

26. (Amended) An arrangement according to claim [25]21 wherein the piezoelectric resonator has a second excitation electrode and a second electrically conductive strip extending from the second excitation electrode to a lateral surface.

29. (Amended) An arrangement according to claim 21[22], further including a second electrically conductive strip extending from the first excitation electrode to the lateral surface, and the second mounting element having a second electrical contact surface that operably contacts the second electrically conductive strip when the piezoelectric element is clamped between the first and second mounting elements, wherein the first and second electrical contact surfaces are operably connected to [means]an apparatus for production [and regulation] of current flow.

30. (Amended) An arrangement according to claim 21, wherein at least one of the first and second mounting elements is elastically mounted on a base I[n an elastically resilient fashion].

31. (Amended) An arrangement according to claim 21, wherein at least one of the first and second mounting elements is elastically connected [with]to a base structure [in an elastically resilient fashion].

32. (Amended) An arrangement according to claim 21, wherein at least one of the first and second mounting elements includes [is made up of] an essentially rigid portion [part] and an essentially elastic portion[part], whereby the elastic portion[part] is located closer to a base structure on which the mounting element is mounted.

38. (Amended) An arrangement according to claim 37, wherein the first mounting element, the second mounting element and the base structure are formed integrally to collectively comprise a one-piece construction.

41. (Amended) An arrangement according to claim 40, wherein the structure is in the shape of a step. [a stepped region.]

42. (New) An arrangement according to claim 27, wherein the first and second electrical contact surfaces have a shape that is complementary to the shape of the lateral surface.